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ABSTRACT

The Verbal Measure of Information Rate (VMIR) is a measure of information rate which reflects the elements, features, and changes in a complex environment. Subjects rated 14 bipolar adjective pairs to indicate an appropriate description of the learning situation or information load (simple-complex, novel-familiar). The measure was administered to undergraduates in a four-unit experimental course entitled "Learning Analysis." Each unit presented a different subject and teaching method: speech (experiential learning); mathematics (peer discovery); physics (lecture-demonstration); and English (open classroom). Students rated the last week of each of the four units, and again rated all four units during the final exam. Statistical analyses were conducted for evidence of group consensus in the ratings, as well as consistency of individual ratings over time. The results demonstrated that the students were able to describe the environmental load of a classroom in a consistent and logical manner, and suggested that the VMIR may be better used in a comparative framework than for rating a single environment. (Author/JAC)

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Classroom Use of a Verbal Measure of Information Rate: An Exploratory Study

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Abstract

College students used the Mehrabian and Russell Verbal Measure of Information Rate to describe a series of four very different instructional units while they were participating in them and again at the completion of the four units. The results (1) demonstrate that the students are able to describe the environmental load of a classroom in a consistent and logical manner and (2) suggest that the Measure may be better used in a comparative framework than for rating a single environment.

Environmental psychologists have suggested that if we are able to characterize the information rate or "load" of an environment, we can use that information to design environments appropriate to the optimal performance of different kinds of persons on various tasks. Mehrabian (1976b) gives a variety of such examples in his recent book Public Places and Private Spaces: The Psychology of Work, Play, and Living Environments. It is the classic work of Berlyne, Hebb, Lindsley, and Malmo on arousal which led to the hypothesis that the arousal level elicited by an environment is a direct correlate of its information rate, and which provides the background for the current interests in environmental design.

Classrooms are complex environments. They vary as a function of the physical properties, objects, persons, behaviors, tasks, temporal paces, and interaction of all these phenomena in them. Methods for describing classroom environments have generally focused on parts of the environment rather than the whole. Flander's Interaction Analysis is one such example, focusing objectively on verbal behavior and the patterning of verbal behavior among teacher and students.

Mehrabian and Russell (1974b) have proposed a verbal measure of information rate which can reflect all the elements, features, and changes in a complex environment. Furthermore, this measure has the advantages of avoiding the cumbersome aspects of physiological measures while being logically related to them, automatically accommodating for differential familiarity and meaningfulness of stimuli by using subjects' own judgments, being simple and quick to administer, and using items which load on arousal only.

The data reported here derive from an attempt to apply the Mehrabian and Russell Verbal Measure of Information Rate to a variety of real

classroom settings. Earlier research with this measure has been limited to the rating of written descriptions of situations and of photographic slides (1974b). If it can be shown to be a reliable and valid indicator of load in field as well as in laboratory situations, then it may ultimately help in designing optimal learning situations to meet both group and individual needs.

Method and Data Source

The Verbal Measure of Information Rate consists of 14 nine-point rating scales anchored by bipolar adjective pairs describing aspects of load (e.g., simple-complex, novel-familiar). Each of the 14 adjective pairs has been shown to load on arousal only, not on pleasure/evaluation or dominance. High/low load adjectives are arranged randomly so that response biases do not affect the score. Total score is calculated as the sum of the nine scale ratings scored from -4 (low load) to +4 (high load). Subjects were given modified instructions to put a check mark somewhere along the line between each pair of adjectives to indicate what they thought was an appropriate description of the "learning situation or the relation among the various parts of the learning situation."

The Measure was administered to 118 college students in four sections of Learning Analysis, a credit/no credit freshman level experimental course at the University of Nebraska at Omaha (student population = 15,500). Learning Analysis consists of an introductory three-week unit on cognitive style and the principles of learning and four three-week content units, each of which presents a different discipline using a different teaching method. The four content units are presented to each of the four sections of Learning Analysis in a predetermined random sequence similar to that of a Latin-square. Teaching methods and content units were as follows:

Experiential (Speech), Peer Discovery (Mathematics), Lecture-Demonstration (Physics), and "open" Classroom (English) (Note 1). The purpose of Learning Analysis is to help students understand their learning reactions in a variety of situations so that they will become more sophisticated consumers of their own education (Cross, 1976). Five faculty teach the course.

Students used the Measure to rate the unit they were currently experiencing during the last week of each of the four content units, and again rated all four content units during the final exam period at the end of the course. Eighty-six students completed the course. Complete data sets are available for 50 to 64 of them, depending on the content unit. Erratic student attendance patterns account for the data loss as all measures were completed in the classroom. Cognitive style and biographic data was also collected.

Results

Evidence of group consensus in the rating of classroom environments as well as consistency of individual ratings over time are two ways of establishing reliability. One-way analyses of variance of load ratings over the four sections performed for each content unit showed significantly different ratings only for the initial ratings of the "open" Classroom environment ($F = 3.01$, $p < .05$). Sections did not significantly differ in their initial load ratings of the other three units or in their final load ratings of any units (all p's $\geq .16$). Correlational analyses indicated that initial to final load ratings by all participants for each content unit were also statistically significant although moderate in value (r's $\geq .37$, all p's $< .001$). These results describe reasonable consistency of scores, especially in light of the confounding of the

initial load ratings over sections due to variation of time and unit sequences. This confounding may account for a discrepancy found between initial and final ratings. When content units are arranged in rank order by mean load rating for each section, Kendall's Coefficient of Concordance is significant for final ($W = .775$, $p < .01$) but not for initial load ratings ($W = .131$, n.s.), indicating greater agreement among sections as to the relative loads of each unit for the final as compared to the initial ratings.

Mean initial ratings of units over all subjects were significantly different ($F = 2.99$, $p < .05$). From high to low load the means were as follows: Experiential ($\bar{X} = 2.18$, SD = 10.02), Peer Discovery ($\bar{X} = -.16$, SD = 7.47), Lecture-Demonstration ($\bar{X} = -.45$, SD = 8.69), and "open" Classroom ($\bar{X} = -.86$, SD = 7.79). Newman-Keul step wise tests of the ordered means were performed. Load ratings for the Experiential unit significantly differed from all other units (p's $< .05$) and no other comparisons were significant.

Mean final ratings of units over all subjects were significantly different ($F = 7.09$, $p < .001$). From high to low the means were as follows: Experiential ($\bar{X} = 6.03$, SD = 11.48), Lecture-Demonstration ($\bar{X} = -.31$, SD = 12.72), Peer Discovery ($\bar{X}=-.96$, SD=11.0) Open Classrm. ($\bar{X} = -2.58$, SD = 12.21), N = 74. Newman-Keul step wise tests of the ordered means were performed. Load ratings for the Experiential unit significantly differed from all other units (p's $< .05$) and no other comparisons were significant. Note that the sequence of mean initial and final load ratings of content units are similar but that the range of means is greater on the final ratings.

These results are consistent with observer and instructor expectations relative to task and classroom novelty and with the relative complexity

of the interaction analyses patterns.

Load ratings are potentially related to familiarity with instructional method, screening or tolerance for high load environments, and achievement. Other characteristics such as arousal seeking (Mehrabian & Russell, 1974a) may also be related and obscure simple relationships. Correlational and other analyses indicated that students who were familiar with an instructional method before taking Learning Analysis were favorable towards it (all p's $< .001$) but that familiarity affected load ratings only for the final ratings of the "open" Classroom where experienced students perceived the open classroom as more highly loaded than did unfamiliar students. One possible explanation is that familiar students perceived and took advantage of the opportunity to self-initiate projects whereas less familiar students did not. The distinction between what students expected an open classroom to be and their actual experience may also partly account for the relation between familiarity and load. Screeners (Mehrabian, 1976a) initially rated the "open" Classroom as higher load than did non-screeners, although this distinction was not sustained in the final ratings. Load did not interact with familiarity or screening in other course designs. Since the achievement data for Learning Analysis are expressed in credit/no credit terms, the determination of which varied by instructor, they are insufficiently articulated and standardized to attempt to demonstrate any relationship to the load ratings.

Educational Significance

The results demonstrate that college students can use the Mehrabian and Russell Verbal Measure of Information Rate to describe the environmental load of a classroom environment in a consistent and logical manner.

The ratings, while sensitive to individual differences, demonstrate consistency across sections and over time. The greater range and consistency of order for mean unit ratings of final as compared to initial ratings suggests that the Measure may be better used in a comparative framework than for rating a single environment.

Reference Note

1. Classroom observation and interaction analyses of videotapes of each content unit established the operational validity of the distinctions among instructional methods. Note that the Peer Discovery model used a semi-programmed sequence of written learning tasks with the instructor providing frequent individual prompts and group instructions. The "open" Classroom environment suffered severe space and equipment limitations such that the instructional method might better be described as small group discussion in which the instructor initiated a topic and then facilitated student interaction. The "open" Classroom instructor agreed with the course evaluator that the term "open" did not well describe the instructional strategy actually used.

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